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Staying one step ahead remains the goal – Modernisation and digitalisation as success factors

■ Rudolf Buyna, Michael Dolon, Masa GmbH, Germany

It is no secret that the success of companies goes hand in hand with continuous and targeted innovation and modernisation. The optimisation of structures, flexible innovation management for products and processes or the use of new technologies remain important in order to stay a little ahead of the competition. The decisive factor for the company Rünz & Hoffend GmbH & Co. KG, based in Urmitz/ Germany, to realise an ambitious modernisation project with Masa GmbH as its partner.

Hugo Kessler has been the new man at the helm of Rünz & Hoffend for a good four years now. A generational change at a very active concrete block manufacturer, which – like many other companies in the Neuwied Basin – has its origins a century ago in the pioneering days of the pumice industry. The great-grandson of company founder Lorenz Hoffend knows that today it takes much more than a shovel and a cross hoe to keep a company on the road to success. Product developments, investments and many innovative approaches are essential, for example. "You can't afford to miss the boat!"

Hugo Kessler is certain. It is important to keep an eye on the topics of sustainability and digitalisation, which are becoming increasingly important worldwide. Many concrete plants still have a lot of catching up to do in this area, even compared to other industries.

The foundations of success

Rünz & Hoffend is a company steeped in tradition. At the same time, a young, progressive spirit blows through the highly modernised concrete plant in Urmitz. Just one of the visible signs are the roofs of the administration buildings and production halls. Rooftop photovoltaic systems with an output of 600 kW/peak cover almost 40 % of the electricity requirements with the company's own green electricity.

In the administrative area, a lot has been done in terms of multimedia for employees, visitors and customers. "Living digitalisation" is a matter for the boss, so to speak. Just like the four most important criteria that Hugo Kessler believes a



Modern and perfectly organised: The Rünz & Hoffend concrete plant in Urmitz, Germany



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■ Michael Dolon first completed an apprenticeship as a power plant electronics technician and then studied electrical engineering, specialising in automation. He has been employed at Masa GmbH since 1994. Here he worked for several years in the areas of plant commissioning and software development. In 2003, he became head of the electrical design department, where he is responsible for the continuous further development of Masa control software and visualisation, among other things.
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modern production facility must fulfil: Occupational safety, product quality, plant availability and tidiness & cleanliness. These foundations of success must be able to withstand continuous inspection and be subject to gradual modernisation as required. Last year, Rünz & Hoffend invested a considerable sum in precisely these areas that have an impact on success. The recently completed measure focussed on the control systems in terms of software/hardware and safety. The partners in this retrofit project were Masa GmbH and the local company Josef Müller Söhne GmbH & Co. KG.

**Occupational safety:
Effectiveness and practicability must be in harmony**

The Urmitz-based family business takes a broad view of the concept of family. At Rünz & Hoffend, employees are seen as part of the family, which is why occupational safety is nat-

urally a top priority. The production facility should be up to date in terms of safety, and not just with the end of the grandfathering regulation that applied to older workplaces in Germany until the end of 2020. Hugo Kessler recognised the challenge of finding a modern, safe and at the same time very practicable safety solution for his plant and entrusted the Masa safety engineers with this not entirely simple task. He describes the core of the problem as follows: "The more complicated safety gets, the more creative people become in circumventing these very safety systems. So, Masa had to think both ways here."

It took the project managers from both teams, Masa and Rünz & Hoffend, collaborating on multiply topics with in-depth discussions on various approaches to reach consensus on the final solutions. Above and beyond the overall safety concept, measures such as the acoustic start-up warning or the visual



Retrofits can be challenging projects, which typically coincides with production downtime.

“My milestone will swiftly restore your plant to full capacity.”

Jörg Fichtner, PLC programmer and commissioning engineer, Masa Andernach



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At Masa, we think of nothing but concrete – and how to shape it for the building materials industry. The machines we design and build are used for the production of concrete blocks, pavers, landscape products, as well as sand-lime bricks, aerated concrete blocks and panels. In other words, we are real concrete heads with a passion for reliable, high-performance machines.

Our smart concrete head, Jörg Fichtner, drives innovation in Masa plant control systems. From tackling challenging tasks in software commissioning to ensuring seamless transitions at construction sites, Jörg's expertise ensures new or upgraded production plants are primed for quick operation. Masa's live visualisation system intuitively connects the plant operator to the manufacturing equipment facilitating faster troubleshooting and maximum efficiency.

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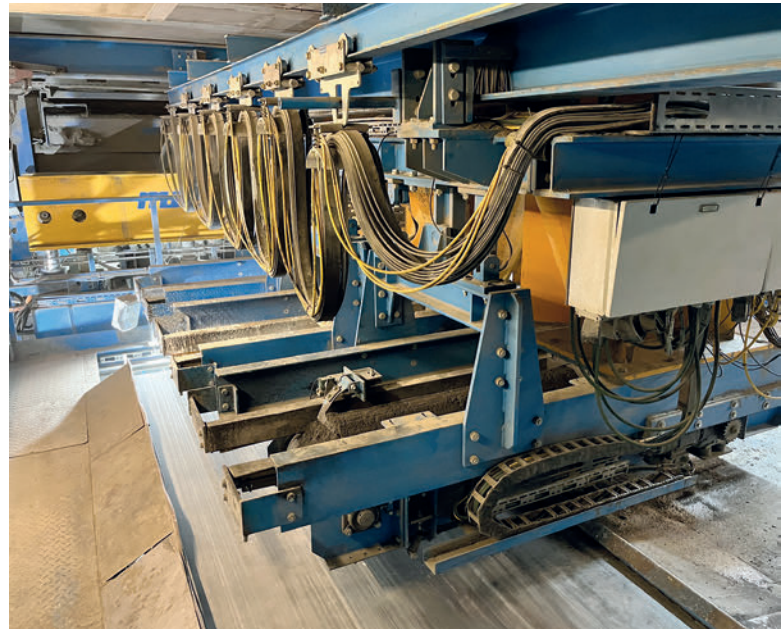


Safe and practical: Lockout-Tagout maintenance protection

route warning device in the area of the finger car are rated very positively by the production employees, as are the installed rotating beacons, which serve as visual signalling devices to detect and warn of danger spots. Initially, the new key transfer system took some getting used to. It ensures that the critical safety areas are secured with keys that are mechanically locked or released against each other according to a predetermined sequence. In the meantime, however, this system has achieved a very high level of acceptance among the plant operators. The "Lockout-Tagout" maintenance safety devices defined via the Masa Safety concept, which are used to protect against unauthorised access or unintentional activation, for example during a maintenance procedure, also give the operating personnel one thing above all: safety and a good feeling during their daily work.

Product quality & product development: Meeting current market requirements with innovative products.

The company's good reputation, which is best reflected in outstanding product quality, must be maintained in the spirit of the family. The wall-building materials produced must fulfil customer expectations, particularly in terms of their physical properties. In the area of landscaping products, it is also important to deliver customised and visually appealing goods. In this segment, which tends to be focussed on private customers, price plays less of a role in the purchasing decision. What counts first and foremost is the look.



Colour mix system with conveyor belt

Hugo Kessler sees a clear brand development here, particularly in the area of coloured main mix concrete. The market for nuanced garden walls and shuttering blocks is currently growing in Rünz & Hoffend's sales area, but is characterised by major regional differences. Mediterranean flair, for example, is more in demand in the south of Rhineland-Palatinate. To enable Rünz & Hoffend to serve this differentiated market adequately in future, an effective technical solution was installed in a joint development:

A frequency-controlled belt transports the main mix concrete into the silo of the block making machine. The amount of concrete required depending on the recipe is controlled accordingly by setting the dosing time and speed. Hugo Kessler was already impressed by the functionality of the belt during the first practical test.

To produce multi-coloured main mix concrete blocks, the concrete is conveyed from the existing colour mix system to the machine's main mix silo using conveyor belts. Masa integrated this system into the control and visualisation system as well as into the recipe database.

The entire team is certain that these solutions have brought the production plant a considerable step forward in terms of the reproducibility of main mix concrete mixes.

Plant availability & digitalisation: Networked and future-proof

Only fast spare parts procurement guarantees high availability of the production plant. A simple principle. Conversely, this also means that if series such as the Simatic S5 are discontinued, spare parts will no longer be available at a certain point in time. With fatal consequences for plant availability.

At Rünz & Hoffend, there was exactly one area that was still controlled by the old S5 system: The mixing plant for main

mix concrete with a Masa PH 3000/4000 mixer, which was installed in 2012. The unavoidable replacement of this control system was the starting signal for a much more far-reaching retrofit project. Because when Hugo Kessler does something, he does it right. The inventory at the Urmitz concrete plant offered much greater potential for improvement than the originally planned control system migration: the creation of a fully networked plant with the latest automation technology! Although large parts of the previous control centre of the production plant (face mix plant, block making machine) were already based on the Simatic S7 system, they had an older generation of Delphi visualisation. To set the course for well thought-out digitalisation in the concrete plant, the Masa project team worked with Rünz & Hoffend to gradually develop a future-proof solution.

Industrial, consistent and reliable Ethernet communication based on Siemens Profinet, in combination with the Siemens TIA Portal, offers the latest generation of automation standards.

This solution was realised with the specially developed Masa plant control software FAST (Factory Automation System Tool), which offers a wide range of functionalities and log data.

"The plant now talks to us much better," summarises Hugo Kessler. "The positive effects on availability are unmistakable." This significant improvement is achieved through the interaction of various hardware and software components, only a small selection of which are explained in more detail here:

- **Product changeover**
The more the individual plant components communicate with each other, the better the automatic interaction of plant components. With the new system, Masa has created a solid basis for these demanding communication tasks. Just how efficient it is can be seen, for example, in the time that a product changeover on the dry side now takes: "Less than a minute," reveals Hugo Kessler succinctly.
- **Provision of log and plant data**
The system can automatically and regularly store relevant plant data on a server in various file formats via an interface. Information such as the number of cycles, the type of products, cement consumption or silo fill levels can be easily called up by the plant manager or plant operator before the shift begins. This eliminates the need for many handwritten and very time-consuming entries. The plant operator receives the data directly on his mobile device in a clear format, also by email if required, and can react much more quickly if necessary.
- **Analyses**
Weak points can only be rectified if they are recognised. The plant data provided by the system with a freely selectable analysis period supports the operator in optimising production. This is particularly relevant in 3-shift operation, when managers are not on site around the

clock and the plant operator needs a reliable basis for making decisions immediately. "Knowledge is power," summarises Hugo Kessler. The input history tool can also be used in this sense, although it is only used occasionally, but is also helpful in troubleshooting.

- **Product families**
If master data is managed intelligently and efficiently, the time required to maintain the basic data is significantly reduced. This is where a tool comes in that allows product families to be individually compiled and stored. Recipe changes that affect a product family are made once and then automatically affect all subgroups. Both global changes to cross-recipe values and local changes to recipe-related values are possible.
- **Recipe comparator**
Especially in the initial phase after the changeover to the new control system, Rünz & Hoffend benefited from the option of having the system automatically compare recipes. This is because Rünz & Hoffend did not blindly drag the old recipes into the new system environment. Each recipe was checked, recreated, and compared with each other. Manually and without system support, this would probably have been the proverbial Sisyphean task. With the help of the recipe comparator tool, this work was successfully completed within a very short time, so that the plant could go back into production at an early stage.
- **Product list**
The chamber system at Rünz & Hoffend, in which the products harden, has space for over 15,000 production boards. A large number of products are stored here, including highly customised design pavers with a rather low order volume. It is not uncommon for 10 to 15 different products to be stored in the chambers. Time is always a factor, so the storage and retrieval logistics, which are coordinated by the Masa finger car, take these customer-specific requirements into account. Based on a special product list sorted according to customer requirements, retrieval in these cases follows a batch-based first-in-first-out (FIFO) principle. Depending on the order status, other sorting methods are also possible - always with the aim of utilising the chamber system in a cost-, space- and time-efficient manner.
- **Fault messages**
Detailed logging, signal lights on the control panel and collective fault message lights alert the plant operator immediately and specifically to possible malfunctions, which can thus be identified and rectified more quickly.

Tidiness & cleanliness: In the direct working environment and in the control structure

There are nicer places than a concrete factory. The production process for concrete blocks is inevitably associated with dust and noise. Nevertheless, a concrete plant can also offer an attractive working environment - if, for example, tidiness and



Well-coordinated and customised solutions: storage and retrieval logistics in the curing area

cleanliness are a high priority for the company management. The fact that this is the case at Rünz & Hoffend is evident to any visitor after just a few steps on the company's outdoor premises. Accurately paved, clean storage areas for finished end products, a tidy mould park, structured access routes to all areas of the site. The company is doing its bit to cultivate the image of the industry. "Both employees and customers benefit from the good general working conditions," emphasises Hugo Kessler. "But we're also not doing too badly here in terms of the shortage of skilled labour in Germany."

When you enter the interior of the production hall, you will find a compact but highly efficient production facility that produces a wide range of gardening and landscaping products and an extensive range of wall-building materials in 3-shift operation. Maximum order and clarity also prevail at the plant's central control stand. Large windows provide an all-round view from the soundproofed and air-conditioned room. In addition, the plant operator can view the various plant areas and statuses at any time via monitors. An impressive eight screens for the plant components and five camera screens are installed here.

When tidiness runs like a red thread through the company, the expectations of the visualisation of the newly installed software are obvious. It should be clear, straightforward, logical, and easy to use. The modular Masa plant control software absolutely fulfils these requirements. The changeover and familiarisation phase went smoothly thanks to a standardised and comprehensible tree structure for the operating personnel. Orientation within the input masks and protocols is easy, as Masa has implemented consistent standard templates based on common Office applications with a high recognition value. The relevant parameters are clearly arranged on the screen and there is no need to scroll within the page. Switching to different hierarchy levels is done intuitively at the click of a mouse. Setting favourites also facilitates usability.

The Masa Live Motion with its realistic animation of the moving plant components in real time proves to be particularly practical when visualising the finger car, as it largely replaces the previously common but less convenient ride-along on the finger car. From a safety point of view, this is definitely an advantage.

Local cooperation for a quick solution

It was clear to everyone involved that the modernisation project at Rünz & Hoffend would be very extensive, at the latest when the contract was signed. The most favourable time of the year from a production perspective was chosen for the actual conversion phase at the plant: winter. But here, too, every day counted, as every day the plant is out of action incurs considerable costs for the company. Hugo Kessler therefore set a very ambitious target: production was to be fully up and running again after six weeks of plant downtime at the latest. An extremely tight time frame that could only be met with the utmost discipline, detailed planning, precise preparatory work, and reliable co-operation with a competent third-party company. Masa openly communicated from the outset that it simply did not have sufficient in-house capacity for the complete electrical installation with extensive safety technology, the laying of cables and the assembly of the control cabinets during this period. For Rünz & Hoffend, this was an honest statement that once again characterised Masa as a reliable business partner.

Thanks to the local cooperation between Masa and the specialised electrical company Josef Müller Söhne GmbH & Co. KG, two experienced companies from Andernach realised the task quickly and professionally. This was only possible because the project managers from both companies worked conscientiously and hand in hand. The early preparation and handover of the circuit diagrams by Masa was followed by days of intensive work laying several kilometres of cable by Josef Müller Söhne.

The further course of the project was also characterised by a very structured organisation and a high level of commitment from everyone involved, which paid off. Nevertheless, the first phase of commissioning, without any material, was a real challenge for the Masa team led by Jörg Fichtner and Andreas Hück. For new plants, the control cabinets are usually pre-wired and tested in the Masa electrical workshop without any stress. In this project, however, the wiring of the existing mixer, machine, finger car control cabinets, the subsequent wiring, and the obligatory tests of all functions had to be carried out during commissioning. Another challenge was posed by the parallel winter repairs at the plant: Components such as the main mix concrete mixer were still dismantled for maintenance and repair purposes and had to be reassembled before the functional tests could be fully carried out.

In addition to the excellent cooperation between the companies involved, Jörg Fichtner also rated the presence of the Managing Director as positive: "Hugo Kessler attached great importance to the details during his daily visits. Open and very focussed discussions were always possible with him."

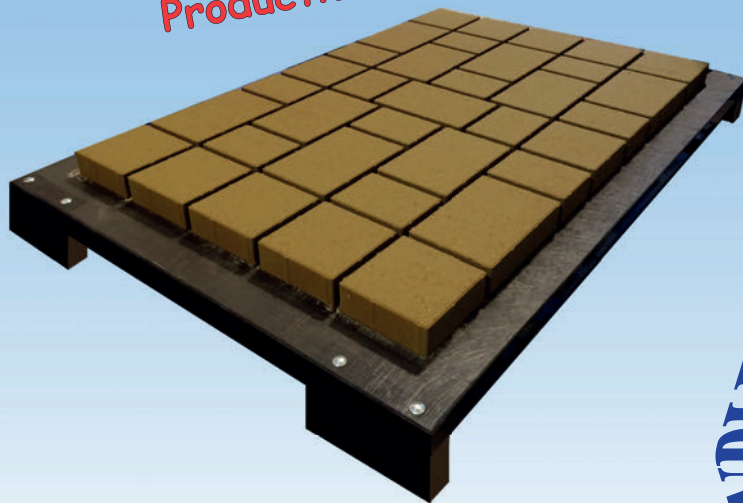


Control stand at Rünz & Hoffend before and after modernisation



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Just five weeks after the plant was shut down, the first fresh start was made in the new system environment. And just a few days later, the Rünz & Hoffend team ventured their first free trials in 3-shift operation. With a lot of trust in the experts from Andernach, who deliberately stayed in the background. Looking back, Hugo Kessler describes the situation, which he certainly wanted, as follows: "On the one hand, we had enormous internal pressure from sales, as demand was booming. On the other hand, the motivation for my employees to operate the system independently as quickly as possible and gain their own experience was significantly higher with this approach. However, we also knew that Masa's project managers would have jumped into the breach at any time if necessary. The fact that we didn't need this safety net once again speaks volumes for the quality of the entire project organisation."

The Managing Director of Rünz & Hoffend is visibly proud of his modernised plant. From his point of view, the entire project benefited from one factor in particular: the personal, professional dialogue with the Masa team of experts. Because when it comes to sensitive and important matters, Hugo Kessler still values face-to-face discussions - despite all the openness towards digitalisation and the resulting possibilities. Short communication channels and quick decisions thanks to the strong presence of the Masa specialists contributed significantly to the successful completion of the project. And the future

Regarding digitalisation, Hugo Kessler still sees a lot of potential for the future at concrete block and paver plants. Above all, successful implementation requires trust and a fundamental approach to the topic. However, despite all the ambition, one thing must not be lost sight of: The cost-benefit ratio must be right.

One thing is certain: more projects will be added and the question of digitalisation readiness in concrete block and paver plants remains exciting. ■



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